The *DISCERNN* Project

CS5100/CS6100 - Spring 2017

DISCERNN is a system providing the functionality necessary to study the fundamental nature of the relation between computing with automata vs. recurrent neural networks. Functions to be developed include:

1. A CVS development system
2. An interface (GUI)
3. Library Operations (on FSA, Probabilistic FSA (PFSA), DPDA, TM, L programs, RNNs)
   * add
   * delete
   * replace
   * dir
4. Conversion operations
   * FSA 🡪 L program
   * FSA 🡪 RNN
   * L program 🡪 RNN
   * DPDA 🡪 RNN
   * TM 🡪 L program
   * FSA 🡪 regular language
   * DPDA 🡪 CFG
   * CFG 🡪 Chomsky Normal Form Grammar
   * PDFA 🡪 RNN
   * RNN 🡪 TM
   * TM 🡪 grammar
5. Execute operations
   * FSA
   * PFSA
   * L program
   * DPDA
   * RNN (with multi-step input)
   * TM
6. Equality Check
   * FSA – FSA
   * L program – L program
   * DPDA – DPDA
   * FSA – RNN
   * L program – RNN
   * DPDA – RNN
   * RNN – RNN
   * PFSA – PFSA
7. Other issues
   * Trained RNN (using backprop)
   * Decidability
   * Complexity
   * Performance Analysis
   * Information Measures